Appendix C – Section 7 Endangered Species Act Consultation / Fish and Wildlife Coordination Act

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

MAY 2 6 2010

IN REPLY
REFER TO:
MP-410
WTR-1.10

MEMORANDUM

To: Susan Moore
Field Supervisor

From: Richard J. Woodley /S/ RICHARD J. WOODLEY
Regional Resources Manager

Subject: Request for Concurrence that the Volta Wildlife Area Level 2 Diversification and Incremental Level 4 Development Pilot Project Is Not Likely to Adversely Affect Giant Garter Snake

The Bureau of Reclamation proposes to provide American Recovery and Reinvestment Act (ARRA) funding for the installation of two groundwater production wells and two monitoring well clusters along the Volta Wasteway. This Volta Wildlife Area (Volta WA) Level 2 Diversification and Incremental Level 4 Development Pilot Project (Pilot Project) is proposed for a period of 3 years. Based on implementation of the proposed avoidance measures Reclamation has committed to, as described in the *Project Monitoring Plan for the Volta Level 2 Diversification/Incremental Level 4 Development Pilot Project* and the biological assessment, Reclamation is requesting concurrence from the Service that the proposed Pilot Project is not likely to adversely affect the federally-threatened giant garter snake (GGS) (*Thamnopsis gigas*).

The proposed Pilot Project is located at the southern end of Reclamation-owned and California Department of Fish and Game-managed Volta WA in west-central Merced County, northwest of the city of Los Banos, California. The proposed well sites are located on each side of the Wasteway within the Volta WA and are described in Reclamation's revised Biological Assessment submitted to the Service on March 16, 2010, as well as the Draft Environmental Assessment posted on Reclamation's Web site on March 2010. The pumped groundwater would be used to diversify Level 2 Refuge Water Supply sources, supplement the source of Incremental Level 4 Water Supply, and improve water supply reliability for Central Valley Project (CVP) contractors. The San Luis Delta Mendota Water Authority and the Grassland Resource Conservation District are among the beneficiaries of the proposed Pilot Project.

Reclamation proposes to pump up to 2,000 acre-feet (AF) of groundwater for the first year (September/October through January/February). In years two and three, the duration and volume of groundwater pumped annually may increase to year-round pumping of up to 5,000 AF. An increase would occur only if, after the first year of production at the 2,000 AF level, the monitoring data show suitable water quality and water levels that would sustain additional pumping.

The proposed Pilot Project would plan for, design, and construct the needed facilities (June 2010 start), and then operate the wells and monitor well production, water quality, and water levels during the

three-year period (September 2010 to February 2013). The total amount of groundwater pumped annually would be split 50/50 between Level 2 and Incremental Level 4 water supply in order to comply with CVPIA Section 3406(d)(1) diversification goal. The pumped groundwater would be delivered in-lieu of south-of-Delta Refuges receiving a portion their CVP Level 2 surface water supply. The expected substitution ratio is 2 AF of groundwater to 1 AF of surface water.

In discussions between our agencies during the past few weeks, Reclamation recognizes that salinity and other constituent levels in water are both spatially and temporally dynamic. Therefore Reclamation proposes an adaptive approach that provides flexibility in water operations while addressing salinity and other water constituent conditions in the Volta Wasteway. Such an adaptive approach requires the collection of important ground and surface water quality data; therefore, Reclamation has worked with the project proponents and the Service to develop the monitoring plan and thresholds specifically in response to the proximity of the project to one of the few breeding GGS populations within the San Joaquin Valley and to water conditions within the Volta Wasteway. These thresholds are based on constituent levels within the Volta Project conveyance channels and at the well heads, and take into consideration dynamic conditions associated with many factors such as, but not limited to, flow seepage, runoff, water management operations, and water table influence. Any other projects with similar issues should be evaluated independently and water quality thresholds for those projects should be based on project objectives, habitat conditions, species of concern, management goals, and water quality conditions in the associated conveyance system.

Reclamation has revised the original monitoring plan (provided as Appendix C to the Biological Assessment, dated March 2010) to incorporate changes to the water quality monitoring and biological evaluation plans as discussed between our agencies and as summarized above. The revised monitoring plan has been provided to the Service and now supersedes the March 2010 version of the plan. The monitoring plan and water quality-based thresholds are specific to the Volta Project and are not intended to establish water quality thresholds for other water conveyance systems.

Reclamation recognizes that the requirement of meeting 2 ug/L of selenium at the well heads is currently not a regulatory requirement or consistent with SWRCB water quality objectives outlined in the Central Valley Basin Plan. However, we have reached agreement with the Service on applying these thresholds for this Pilot Project in an effort to ensure that project implementation will not adversely affect GGS in the Volta WA, as well as to retain selenium assimilative capacity of the water supply in the North Grasslands area so that downstream users are provided flexibility in diversifying their water supplies. Any other projects that arise with similar issues should be evaluated in a similar independent fashion, and water quality thresholds for those projects should be based on project objectives, habitat conditions, species of concern, management goals, and water quality conditions in the associated conveyance system. This Pilot Project will provide additional water quality data combined with the biological data specific to GGS habitat to assist in the refinement of measures to protect the species for a long-term Volta Project.

We appreciate the effort that has been expended by the Service in assisting us with this project. If you have any questions please contact Ms. Shelly Hatleberg, Natural Resources Specialist, at 916-978-5050 or shatleberg@usbr.gov.

WBR:SHatleberg:CMunoz:05/26/2010:916-978-5050
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Surname: MP-410(2),MP-400

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to
81420-2010-TA-0715

MAY 27 2010

Memorandum

To: Regional Resources Management Division, Bureau of Reclamation, Mid-Pacific Regional Office

From: Field Supervisor, Sacramento Fish and Wildlife Service Office, Sacramento, California

Subject: Volta Wildlife Area Level 2 Diversification and Incremental Level 4 Development Pilot Project

This memorandum is in response to the Bureau of Reclamation's (Reclamation) May 27, 2010 memorandum received in the office of the U.S. Fish and Wildlife Service (Service) on May 27, 2010. The memorandum and attached *May 2010 Final Monitoring Plan* request concurrence from the U.S. Fish and Wildlife Service that the proposed Volta Wildlife Area (Volta WA) Level 2 Diversification and Incremental Level 4 Development Pilot Project (Pilot Project) is not likely to adversely affect the federally-listed giant garter snake (*Thamnophis gigas*). Details of the proposed Pilot Project are described in Reclamation's May 27, 2010 memorandum, the March 17, 2010 biological assessment and their *May 2010 Final Monitoring Plan* as well as the Draft Environmental Assessment posted on Reclamation's website dated March 2010. The proposed Pilot Project is located at the southern end of the Bureau of Reclamation-owned and California Department of Fish and Game-managed Volta WA in west-central Merced County, northwest of the city of Los Banos, California. The proposed well sites are located on each side of the Wasteway within the Volta WA and are described in Reclamation's documents listed above.

We have reviewed Reclamation's documents and conclude that based on implementation of the proposed avoidance measures, and other information described in Reclamation's documents listed above as well as information in our files, the Pilot Project as proposed is not likely to adversely affect the giant garter snake.

Unless new information reveals effects of the proposed action that may affect listed species or critical habitat in a manner or to an extent not considered, or a new species or critical habitat is designated that may be affected by the proposed actions, or the action is subsequently modified in a manner that was not considered in this determination, no further action pursuant to the Act is necessary.

We appreciate your efforts to conserve federally listed species and your efforts to avoid adverse effects to listed species that may result from the proposed Pilot Project. If you have questions about this memorandum, please contact Daniel Russell at (916) 414-6600.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
Volta Water Diversification

APR 16 2010

Memorandum

To: Regional Manager, Bureau of Reclamation, Mid-Pacific Region, Sacramento, California (Attn: Tammy LaFramboise)

From: Assistant Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Fish and Wildlife Coordination Act Report for the U.S. Bureau of Reclamation's Volta Wildlife Area Level 2 Diversification/Incremental Level 4 Development Pilot Project

In accordance with 48 Stat. 401, as amended; 16 U.S.C. 661 et seq., this document constitutes the U. S. Fish and Wildlife Service's (Service) Fish and Wildlife Coordination Act (FWCA) report to the U. S. Bureau of Reclamation (Reclamation) for the Volta Wildlife Area Level 2 Diversification/Incremental Level 4 Development Pilot Project (Project). The FWCA requires Federal agencies proposing water resource development projects or involved in issuance of related permits or licenses to consult with the Service and provide equal consideration to the conservation, rehabilitation, and enhancement of fish and wildlife resources with other project purposes. The findings of this report are based on information provided in the March 2010 Draft Environmental Assessment/Finding of No Significant Impact report (Reclamation 2010a) and review of available scientific literature. Our report addresses the proposed Project-related beneficial and adverse effects on fish and wildlife resources and provides recommendations for Project implementation. Details of the project's effects on federally listed species, pursuant to section 7 of the Endangered Species Act of 1973, as amended, are being addressed separately.

Project Description

Reclamation is proposing the construction of two production wells and five monitoring wells along the Volta Wasteway in the Volta Wildlife Area. The 3year pilot project would pump groundwater to provide a portion of Level 2 Refuge Water Supply to Volta Wildlife Area and the Grassland Resource Conservation District. Additionally, the groundwater would be used for the development of Incremental Level 4 water supplies for these wildlife management areas. Level 2 Refuge Water Supply is defined as the annual average volume of water refuges received between 1977 and 1984. The annual amount of water needed for full development of the refuges (as determined by management goals set in the 1980s) is the Level 4 supply, and Incremental

Level 4 refuge water supply is the difference between the historical water deliveries (Level 2) and the supplies required to achieve optimum habitat management (Level 4).

Currently, Reclamation's Refuge Water Supply Program delivers Level 2 water supplies to Volta Wildlife Area from the Central Valley Project's (CVP) surface water. Under the Central Valley Project Improvement Act, Section 3406(d), the Secretary of the Interior, through Reclamation, is responsible for continuing to provide a firm water source of acceptable water quality to refuges and wildlife management areas as well as diversify the sources of supply. Additionally, Reclamation was to have provided full Level 4 water supplies to all refuges by 2002 under Section 3406(d)(1,2). To alleviate the supply concerns, Reclamation, San Luis Delta Mendota Water Authority, several CVP water contractors and south Delta refuge water contractors have proposed to diversify the water supplied to Volta Wildlife Area and Grassland Resource Conservation District by substituting a portion of the surface water needs of the wildlife areas with pumped groundwater to meet both Level 2 and Incremental Level 4 requirements. Volta Wildlife Area's refuge water supply need totals 16,000 acre-feet annually (afa), of which, 10,000 afa is required to meet standards for Level 2 water supply, the remaining 6,000 afa is Incremental Level 4 supply need. The total volume of anticipated pumped groundwater in the first year of operation from the production wells is 2,000 acre-feet with an increase to 5,000 afa in the following 2 years, if well production and water quality are suitable. The total amount of groundwater pumped would be allocated to Level 2 and Incremental Level 4 water supply in a 50/50 split, thus, 2,500 afa for Level 2 and 2,500 afa for Incremental Level 4 supply, if maximum withdrawal is met. An additional 7,500 afa is required for Level 2 supply from the CVP surface water. The 2,500 afa freed up by pumped groundwater would be delivered to San Luis Delta Mendota Water Authority.

Project Area

Volta Wildlife Area and Grassland Resource Conservation District are located in the western portion of Merced County. Currently, water sources are delivered from San Luis Reservoir and O'Neill Forebay via the Delta Mendota Canal and released into the Volta Wasteway. The supply flows through the Volta Wasteway for use by Volta Wildlife Area, and then flows to the northern end of Volta Wildlife Area to be delivered to the Grassland Resource Conservation District. The water supply is used to manage about 1,970 acres (of the 2,891 acres) at the Volta Wildlife Area as seasonal and semi-permanent flooded wetlands (CDFG 2010). Based on Reclamation's Project report (2010a), it is unclear how many acres of wetlands in the Northern Division of the Grassland Resource Conservation District are managed with Volta Wasteway water. The Volta Wildlife Area wetlands are known to support the federally listed giant garter snake (*Thamnophis gigas*) in the perennial water at the north end (Field 10), and provide habitat, breeding areas and food sources for about 150 species of birds, including many waterfowl and shorebirds (CDFG 2010).

Construction and Monitoring

Reclamation plans to construct two production wells and five monitoring wells between May 1, 2010 and October 1, 2010. The production wells would be drilled to a depth of 500 to 900 feet below ground surface (bgs) to reach the aquifer below the Sub-Corcoran Clay. A pair of

monitoring wells would be clustered around each of the production wells, with one monitoring well set below the Sub-Corcoran Clay and another above the Clay in a shallower aquifer. An additional monitoring well would be set 100 feet bgs near Well #1. It is estimated that each production well would take 15 days to construct (10 hours per day). At each production well site, an 8-foot by 10-foot concrete pad and 20-inch discharge pipe routed to the Volta Wasteway would be constructed. The construction area would consist of a 150-foot by 150-foot zone around each production well and a 300-foot long access road from the main road to Well #2. The drill cuttings would be contained in a settling pond on-site.

Upon completion of construction activities, pumped groundwater would be monitored monthly at the production wells and surface water would be monitored weekly in the Volta Wasteway (in the first year) for concentrations of the following constituents:

- Trace Elements (Selenium, Boron, Arsenic, Mercury, Uranium)
- General Minerals (anions, cations)
- Nitrate
- Total dissolved solids (TDS)

If necessary, the pumped groundwater would be diluted with Volta Wasteway water to meet water quality standards and pumping would cease if water quality exceeds the standards. The State Water Resource Control Board water quality objectives in the Central Valley Basin Plan as outlined in the Reclamation Project Report (2010a) are:

- Selenium < 2.0 µg/L
- Boron < 2.0 mg/L March 15 – September 15
- Boron < 2.6 mg/L September 16 – March 14

Environmental Impacts

Atmospheric and Terrestrial

Construction of the wells and initial aquifer testing would consist of about 550 hours of equipment operation and a total fuel consumption of about 19,100 gallons of diesel, leading to the production of greenhouse gas emissions. Construction of the wells would also require the temporary disturbance of two 150-foot by 150-foot areas at the well sites and the disturbance of land associated with the construction of a 300-foot long access road to Well #2. In addition, the timing of the construction activity coincides and could interfere with the nesting season of birds known to occur in the area.

Groundwater

The pumping of groundwater from the Sub-Corcoran aquifer could lower groundwater elevation and potentially cause land subsidence, in an area well known for large subsidence events (Alley et al. 2002). Subsidence at a local level, such as at the production well sites, could result in a change in directional draining patterns in the gravity fed system at Volta Wildlife Area,

potentially causing the draining of the wetlands in the area and a subsequent loss of habitat for migratory birds and wetland plant species.

Of even greater concern are the cumulative effects of groundwater pumping at Volta Wildlife Area in addition to pumping activities already occurring in the San Joaquin Valley (Valley). Groundwater pumping on regional scales can have dramatic effects on the natural resources in the area. The lowering of surface elevation can drop the water table and alter the stream course gradients of the channels flowing downstream (Sun et al. 1999), such as into the Valley. The result of which can cause the steepening of the watercourses draining into the Valley and the subsequent head-cutting (erosion) of the channel upstream of the disturbance area (Wilcox et al. 2001, NCDWQ 2005). The lower water table and increased stream gradient can unnaturally dewater wetland areas and disconnect floodplains from perennial water sources (Yuill et al. 2009); resulting in habitat loss for migratory birds and wetland plants. Furthermore, the advancing upstream erosion can degrade downstream water quality and aquatic habitat by increasing sediment loading (USGS 2000).

Water Quality

Elevated concentrations of various chemical constituents, such as selenium, boron, salts and mercury can have adverse effects on wildlife. The lower San Joaquin River, tributaries, and water supply channels have been listed as impaired under section 303(d) of the Clean Water Act for these and other pollutants. The Central Valley Regional Water Quality Control Board (Regional Board) has adopted several relevant Total Maximum Daily Loads (TMDLs) and is working on additional TMDLs for these water bodies (CVRWQCB 2010).

The Draft Environmental Assessment/Finding of No Significant Impact report does not discuss impacts to water resources downstream of the Volta Wildlife Area. The Volta Wildlife Area currently has relatively good water quality since it is at the top of the water supply system and receives water directly from the Delta Mendota Canal, but water quality diminishes as it cascades through the wetlands downstream of Volta Wildlife Area (Beckon and Milar 2003). The degradation of downstream areas makes it difficult for wetland operators to manage wetlands to meet load allocations and other requirements under Regional Board TMDL limits in a manner that will not harm habitat quality and diversity.

Selenium

Bioaccumulation of selenium (Se) has caused reproductive failure and mortality in aquatic birds foraging on insects and plant material from the wetlands of the Kesterson National Wildlife Refuge (Kesterson) near Volta Wildlife Area and Grassland Resource Conservation District (Ohlendorf et al. 1988). Schuler et al. (1990) found that the Se concentrations were 1,000 to 5,000 times greater in the aquatic plants and aquatic insects than waterborne levels at Kesterson. However, the concentrations at Kesterson during the 1984 studies of Schuler et al. (1990) and Ohlendorf et al. (1988) were much higher than Volta Wildlife Area during the same year (300 µg/L versus 2µg/L). The difference was largely due to the collection of agricultural drainwater at Kesterson and its use as a storage and evaporation facility. Nevertheless, Se levels could become more concentrated on the refuges through evaporation and bioaccumulation, thus, having greater potential to negatively impact waterfowl and other biota feeding at Volta Wildlife

Area or Grassland Resource Conservation District. Higher Se concentrations in the pumped groundwater as compared to the Volta Wasteway (from CVP surface water supply) could exacerbate these impacts, as a short pulse of elevated Se could have lasting effects on the aquatic system (Maier et al. 1998).

The Project Monitoring Plan in the Environmental Assessment (Reclamation 2010a) suggests that Delta Mendota Canal water will dilute the pumped groundwater to assure Se concentrations do not exceed 2 µg/L in the Volta Wasteway. However, Se levels from the pumped groundwater could be significantly higher than 2 µg/L, and since Se levels have historically been low at Volta Wildlife Area, allowing Se levels to rise to 2 µg/L would be counter to state and federal antidegradation policies. The Regional Board determined that mean monthly concentrations of Se should not exceed 2 µg/L (2 parts per billion), as this threshold would be protective of waterfowl (CVRWQCB 1996). Although this level appears to be protective of many species, it is unknown whether this threshold is protective of all fauna.

Boron

In addition to Se, elevated boron (B) concentrations in waterfowl can adversely affect growth rates, and higher levels can decrease survival (Eisler 1990, USDOI 1998). Crops and aquatic plants are also impacted, at levels as low as 0.5 mg/L (USDOI 1998). Wetlands are managed to provide aquatic and moist soil plants for habitat and food sources for waterfowl, thus elevated B concentrations that may impact these plants are of particular concern. The Project Monitoring Plan in the Environmental Assessment (Reclamation 2010a) suggests using the Central Valley Basin Plan water quality objectives for B thresholds, as follows:

- < 2.0 mg/L (March 15 – September 15)
- < 2.6 mg/L (September 16 – March 14)

However, these B concentrations described in the Project Monitoring Plan are maximum values and do not represent the lower monthly mean concentrations, as outlined in the Central Valley Basin Plan. The Regional Board adopted the following water quality objectives for B (CVRWQCB 2002):

- Irrigation Season (March 15 – September 15)
    - **a. 0.8 mg/L (monthly mean)**
    - b. 2 mg/L (maximum)
- Non-Irrigation Season (September 16 – March 14)
    - **a. 1 mg/L (monthly mean)**
    - b. 2.6 mg/L (maximum)

The B objectives put forth by the Regional Board are primarily irrigation standards for crops, however, the Service has generally been supportive of the B objectives as being protective of fish and wildlife resources, particularly aquatic plants.

Salinity

Elevated salinity levels in freshwater systems, such as wetlands, can have adverse effects on the flora and fauna inhabiting these ecosystems (Nielsen et al. 2003). At salinities above 1,000 mg/L, aquatic plants seem to exhibit adverse effects, like reduced root and leaf development and decreased growth rates (Nielsen et al. 2003). Although tolerance to elevated salinity levels may differ across biotic groups, high salinity in the water used at Volta Wildlife Area and Grassland Resource Conservation District could adversely affect the species using these areas.

The Project Monitoring Plan (Reclamation 2010a) does not suggest a salinity threshold for the production wells specifically, but Reclamation's 2010 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan (Reclamation 2010b) has requirements for pump-ins of 1,500 mg/L TDS and upper limits for Delta Mendota Canal salinity that would be suitable threshold criteria for the Project. Although the Project Monitoring Plan did not propose salinity thresholds for the wells, it did suggest limits for the Volta Wasteway downstream of the well pump-ins. These monthly Electrical Conductivity (EC) thresholds are the maximum average monthly values for the five year period from 2005 to 2009, plus the standard error for that month with the maximum EC across the five years. However, the past five years of data include three years of drought conditions; therefore the maximum values represent "worse-case" levels. While the Project description and monitoring plan suggest no increase in salinity beyond the thresholds calculated from the previous five year period, the Project, as proposed, would allow for increased salinity in water at Volta Wildlife Area relative to previous years. The water quality at the Volta Wasteway bridge (where the data had been collected for the threshold calculations) is significantly higher than Delta Mendota Canal water measured at Check 13[1], thus, water quality in the Volta Wildlife Area is degraded relative to the Delta Mendota Canal. For example, in 2009, the average EC at Check 13 was 571 µS/cm (range 248-1,023 µS/cm), compared to 1,253 µS/cm (range 583-1,834 µS/cm) at the Volta Wasteway bridge. It is unclear why the salinity levels at the Volta Wasteway bridge are elevated relative to Check 13 considering the short distance between the bridge and the Delta Mendota Canal, but could be the result of high salinity drainage water entering the Volta Wildlife Area between Check 13 and the Volta Wasteway (*e.g.*, the Tri-Valley Drain).

Mercury

Mercury (Hg) contamination and bioaccumulation is also a concern for humans and wildlife (Sedlak and Ulrich 2009). Hg levels in the outlying areas of Volta Wildlife Area and Grassland Resource Conservation District, such as Mud Slough and the San Joaquin River, are elevated. The higher Hg concentrations in the area are a result of anthropogenic factors exacerbating the release of naturally occurring Hg in the Coastal Range, as well as, the use of Hg in gold mining operations on the eastern side of the Valley. It is unknown whether the Volta Wildlife Area and Grassland Resource Conservation District are accumulating significant amounts of Hg since no monitoring efforts have been initiated at these sites. The lower San Joaquin River and Mud Slough are listed as Hg impaired under the Clean Water Act and TMDLs are being developed. Under the draft Basin Plan amendment for Delta waters, wetlands are identified as significant sources of methylmercury and will receive load allocations. Similar methylmercury load

[1] Accessed on April 14, 2010, from: http://www.usbr.gov/mp/cvo/wqrpt.html

allocations for the San Joaquin River and Mud Slough are expected in the near future. Thus, any additional sources of Hg into Volta Wildlife Area and the Grassland Resource Conservation District will exacerbate the problem.

Special Status Species

A viable, reproducing population of the federally threatened giant garter snake is known to inhabit Field 10 and permanent waters of the Volta Wildlife Area. Elevated Se and Hg concentrations and general poor water quality may have direct and indirect impacts on the giant garter snake. Formal consultation pursuant to section 7(a) of the Endangered Species Act will be addressed separately.

Recommendations

The proposed Volta Wildlife Area Level 2 Diversification/Incremental Level 4 Development Pilot Project could have temporary adverse effects to fish and wildlife and their habitat. If Reclamation proceeds with the project as described, the Service recommends that Reclamation:

- Minimize impacts to annual grassland habitat that is temporarily disturbed during construction by reseeding with native grasses and forbs after the construction is complete.

- Survey the construction sites for ground nesting birds and if nests with eggs are found, it is recommended that either: (1) eggs are removed from the nest and placed in a facility for incubation, or (2) construction is delayed until nesting season is completed.

- Work towards making the proposed project carbon neutral. Consistent with the Intergovernmental Panel on Climate change (IPCC) (2007) adaptation strategies/mitigation recommendations, the Service recommends compensating for the proposed project's carbon footprint by purchasing carbon offsets. Alternatively, carbon offsets could be achieved through sequestering carbon (converting tilled agricultural fields near the project area to native grasslands).

- Monitor and record the groundwater elevation changes at the production and monitoring wells and report results on an annual basis.

- Coordinate with the U.S. Geological Survey to monitor and assess subsidence risk at the well sites as outlined in the Project Monitoring Plan in the Environmental Assessment (Reclamation 2010a).

- Document and map all groundwater pumping activities near the Volta Wildlife Area to better identify subsidence risk.

- Monitor and record water quality data and concentrations of chemical constituents of the surface water and the production wells as outlined in the Project Monitoring Plan for Year 1. Surface water and production well monitoring in Years 2 and 3 should be conducted at the same frequency as in Year 1 (weekly rather than twice a year) since pumping is expected to double during Years 2 and 3 and changes in water quality could occur rapidly.

- The thresholds for the following water quality constituents should be met for the pumped groundwater at the production well heads:

  - Selenium: 2 µg/L (mean monthly concentration)
  - Boron:
    - Irrigation Season (March 15 – September 15)
      - 0.8 mg/L (monthly mean)
      - 2 mg/L (maximum)
    - Non-Irrigation Season (September 16 – March 14)
      - 1 mg/L (monthly mean)
      - 2.6 mg/L (maximum)

- Follow the salinity requirements for Groundwater Pump-Ins as documented in Reclamation's 2010 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan (Reclamation 2010b):

  - Wells must test ≤ 1,500 mg/L TDS at the well heads,
  - Surface water must not exceed 450 mg/L TDS when pumped groundwater is added, and
  - An increase of 30 mg/L TDS due to the well pump-ins shall not occur.

- Monitor methylmercury levels at the production wells and at the Volta Wildlife Area discharge point(s) near the northeast boundary at Field 10 and ensure concentrations do not exceed Delta-Mendota Canal surface water levels at Check 13.

- Cease pumping operations if the water quality is found to be above the thresholds listed above.

- Reassess the project after 3 years. It is also recommended that the proposed project, once completed, not be used in perpetuity, but rather be used only in dry and critically dry water years as an additional source of water for the Volta Wildlife Area.

- Establish assurances that full Level 2 Refuge Water Supply will be delivered if maximum groundwater withdrawal volume is not met.

If you have any questions regarding this report, please contact Mark Littlefield or Becky Walther at (916) 414-6600.

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